

International Conference

# **Photosynthesis Research for Sustainability**

Baku, Azerbaijan  
July 24 -30, 2011

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**Honorary Chairman:** Jalal A. ALIYEV (Azerbaijan)  
**Co-Chairman:** Nejat VEZIROGLU (USA)  
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## FOREWORD

**Dear Colleagues and Friends,**

You are welcome to attend and participate in the International Meeting "**Photosynthesis Research for Sustainability**" that to be held in Baku, Azerbaijan, from July 24 to 30, 2011. This meeting will cover all topics of photosynthesis including hydrogen production and artificial photosynthesis.

More than 3 billion years ago biology developed the capacity to efficiently capture solar energy and use it to power the synthesis of organic molecules. This photosynthetic process set into motion an unprecedented explosion in biological activity allowing life to prosper and diversify on an enormous scale as witnessed by the fossil records and by the extent and diversity of living organisms on our planet today. Indeed, it was the process of photosynthesis over eons of time which has provided us with the oil, gas and coal needed to power our technologies, heat our homes and produce the wide range of chemicals and materials that support everyday life. Today, it is estimated that photosynthesis produces more than 100 billion tons of dry biomass annually, which would be equivalent to a hundred times the weight of the total human population on our planet at the present time and equal to a global energy storage rate of about 100 TW. The success of this energy generating and storage system stems from the fact that the raw materials and energy needed to drive the synthesis of biomass are available in almost unlimited amounts; sunlight, water and carbon dioxide. At the heart of the reaction is the splitting of water by sunlight into oxygen and hydrogen. The oxygen is released into the atmosphere where it is available for us to breathe and to use for burning our fuels. The 'hydrogen' is not normally released into the atmosphere but instead is combined with carbon dioxide to make high energy containing organic molecules of various types. When we burn fuels we combine the 'stored hydrogen' of these organic molecules with oxygen. In this respect, the goal of making artificial photosynthesis is to utilize solar energy and convert it into chemical energy through a series of electron-transfer events. The design of such systems must adhere to the same principle as that of the natural photosystems. Today we have considerable knowledge of the workings of photosynthesis and its photosystems, including the water oxidation reaction. However, many questions and details remain unanswered. To fully understand photosynthetic reactions is not only a satisfying intellectual pursuit, but is also an important goal as we strive to improve agricultural yields and develop new solar technologies for splitting of water and generating fuels. This meeting will highlight work performed around the world to understand the various facets of natural photosynthesis and how this is impacting on research and development of new technologies for food and fuel production. All the selected and invited lectures will provide in-depth analyses of recent progress in the studies of photosynthesis for sustainability. We will have invited 23 plenary lectures and 38 lectures, from 38 countries with around 170 participants.

We are looking forward to meet you in [Baku](#), the Capital of Azerbaijan, and we hope that you can take the opportunity to spend some inspiring and enjoyable days to see some of beautiful sights of Azerbaijan. This will be a great occasion for discussions of previous, present, and future research on natural and artificial photosynthesis and also to meet and interact with researchers and from around the world.

Looking forward to seeing all of you in Azerbaijan.

With best wishes and thanks,

Sincerely yours,

**James BARBER (UK)**

**Jalal A. ALIYEV (AZERBAIJAN)**

**Suleyman I. ALLAKHVERDIEV (Russia)**

**July 24, 2011**

***This meeting will cover all topics of photosynthesis including  
Hydrogen production and Artificial photosynthesis***

#### **LIST OF SECTIONS**

- S 1:** Type I and II reaction centers
- S 2:** Photosynthetic electron flow and photophosphorylation
- S 3:** Mechanisms of water oxidation
- S 4:** Photosynthetic light harvesting
- S 5:** C3, C4 and CAM photosynthesis
- S 6:** Regulation of photosynthetic gene expression
- S 7:** Biogenesis of photosynthetic apparatus
- S 8:** Photosynthesis and environmental stress
- S 9:** Artificial photosynthesis
- S 10:** Photosynthetic and biomimetic hydrogen production
- S 11:** Photosynthesis in relation to crop and biomass productivity
- S 12:** Photosynthetic education
- S 13:** Bioinformatics of photosynthesis

# **CONFERENCE PROGRAMME**

## **TALKS**

# DETAILED DAILY SCIENTIFIC PROGRAMME

*(Lectures, discussion, poster sessions and etc.)*

## 24 July (1st day)

**Arrival**

**Registration**

### **15:30 – Opening ceremony**

Jalal Aliyev (Azerbaijan), Ali Abbasov (Azerbaijan), James Barber (UK), Eva-Mari Aro (Finland), Bill Rutherford (France), Bob Blankenship (USA), Suleyman Allakhverdiev (Russia)

### **16:00-16:35 (35 min) Plenary Lecture 1**

James Barber, Imperial College London, London, UK

*From natural to artificial photosynthesis.*

### **16:35-17:10 (35 min) Plenary Lecture 2**

Hiroshi Nishihara, The University of Tokyo, Tokyo, Japan

*Photosensing systems composed of photosystem I and molecular wire.*

### **17:10- 17:45 (35 min) Plenary Lecture 3**

Seeram Ramakrishna, National University of Singapore, Singapore

*Electrospun nanomaterials for energy.*

**18:00 – Welcome party**

**25 July (2nd day)**

**Chairpersons: James Barber (UK); Suleyman Allakhverdiev (Russia)**

**8:30- 9:05 (35 min) Plenary Lecture 4**

*Jalal A.Aliyev, Research Institute of Crop Husbandry, Ministry of Agriculture of Azerbaijan Republic; Institute of Botany, Azerbaijan National Academy of Sciences, Baku, Azerbaijan*  
***Photosynthesis, photorespiration and productivity of wheat and soybean genotypes.***

**9:05-9:40 (35 min) Plenary Lecture 5**

*Leslie Dutton, University of Pennsylvania, Pennsylvania, USA*  
***Prospects for natural photosynthesis in man-made proteins.***

**9:40-10:15 (35 min) Plenary Lecture 6**

*Jian-Ren Shen, Okayama University, Okayama, Japan*  
***Atomic structure of PSII that enables photosynthetic water-splitting.***

**10:15-10:35 (20 min) Coffee break**

**Chairpersons: Jian-Ren Shen (Japan); Bill Rutherford (France-UK)**

**10:35-11:10 (35 min) Plenary Lecture 7**

*Nathan Nelson, Tel Aviv University, Tel Aviv, Israel*  
***Crystal structure of plant PSI and its utilization as a photovoltaic device.***

**11:10-11:45 (35 min) Plenary Lecture 8**

*John Golbeck, Pennsylvania State University, Pennsylvania, USA*  
***Production of solar biofuels using modified biological components.***

**11:45-12:15 (30 min) Lecture 1**

*Athina Zouni, (Carina Glökner), Technischen Universität Berlin, Berlin, Germany*  
***Progress in the structural biology of photosystem II: a closer look at the acceptor side.***

**12:15-12:45 (30 min) Lecture 2**

*Ernst-Walter Knapp, Freie Universität Berlin, Berlin, Germany*  
***Exploring redox, protonation states and function of the Mn-cluster in PS II.***

**12:45-14:30 Lunch**

**Chairpersons: Norio Murata (Japan); Fabrice Rappaport (France)**

**14:30-15:05 (35 min) Plenary Lecture 9**

*Holger Dau, Freie Universität Berlin, Berlin, Germany*  
***Protonation dynamics in photosynthetic water oxidation.***

**15:05-15:40 (35 min) Plenary Lecture 10**

*Gernot Renger, Technischen Universität Berlin, Berlin, Germany*  
***The fundamental role of the redox couple  $H_2O/O_2$  in solar energy exploitation by the biosphere.***

**15:40-16:10 (30 min) Lecture 3**

*Jean-David Rochaix, University of Geneva, Switzerland*  
***Molecular analysis of state transitions.***

**16:10-16:40 (30 min) Lecture 4**

*Jun Minagawa*, National Institute for Basic Biology, Okazaki, Japan

*A supercomplex of supercomplexes driving cyclic electron flow in photosynthesis.*

**16:40-17:00 (20 min) Coffee break**

**Chairpersons: Jun Minagawa (Japan); Gernot Renger (Germany)**

**17:00- 17:30 (30 min) Lecture 5**

*Arvi Freiberg*, Institute of Physics, University of Tartu, Tartu, Estonia

*Spectroscopic effects associated with self-assembly of photosynthetic antenna proteins into native intracytoplasmic membranes.*

**17:30-18:00 (30 min) Lecture 6**

*Marc Brecht*, Universitat Tuebingen, Instituts für Physikalische und Theoretische Chemie, Germany

*Single-molecule spectroscopy on PSI and PSI-nano-hybrids.*

**18:00-18:30 (30 min) Lecture 7**

*Mahir D.Mamedov*, A.N. Belozersky Institute of Physical-Chemical Biology, Moscow State University, Moscow, Russia

*Electrogenic reactions involving PSII turnover.*

**Chairpersons: Athina Zouni (Germany); Julian Eaton-Rye (New Zealand); Esa Tyystjarvi (Finland); Diana Kirilovsky (France)**

**18:30-19:30 (60 min) Poster viewing/discussion: Sections 1-6**

**20:00 - Dinner**

**26 July (3rd day)**

**Chairpersons: Yuichiro Terashima (Japan); Jean-David Rochaix (Switzerland)**

**8:30- 9:05 (35 min) Plenary Lecture 11**

*Norio Murata, Yoshitaka Nishiyama, Suleyman Allakhverdiev*, National Institute for Basic Biology, Okazaki, Japan

*The mechanism of photoinhibition in vivo: Re-evaluation of previous studies.*

**9:05-9:40 (35 min) Plenary Lecture 12**

*Steven Long*, University of Illinois at Urbana-Champaign, Urbana, IL, USA

*Digital re-design in systems and synthetic biological approaches to improving resource use efficiency in crop photosynthesis.*

**9:40-10:15 (35 min) Plenary Lecture 13**

*Mitsue Miyao*, National Institute of Agrobiological Sciences (NIAS) Tsukuba, Japan

*Lessons from engineering a single-cell C4 photosynthetic pathway into rice: an approach to improve C3 photosynthesis.*



**10:15-10:45 (30 min) Lecture 8**

*Anja Krieger-Liszkay*, Institut de Biologie et Technologies de Saclay (IBiTec-S), CNRS URA, CEA Saclay, Gif-sur-Yvette, France

***Regulation of photosynthetic electron transport and ROS production in plants grown in short day or long day conditions.***

**10:45-11:00 (20 min) Coffee break**

**Chairpersons: Norio Murata (Japan); Eva-Mari Aro (Finland)**

**11:00-11:30 (30 min) Lecture 9**

*Esa Tyystjarvi*, University of Turku, Turku, Finland

***Photoinhibition of PS II - magnetic field effect, singlet oxygen and mechanism.***

**11:30-12:00 (30 min) Lecture 10**

*Imre Vass*, Institute of Plant Biology, Biological Research Center, Szeged, Hungary

***Molecular mechanisms of photoinhibition.***

**12:00-12:30 (30 min) Lecture 11**

*Igor N. Stadnichuk*, Institute of Biochemistry, RAS, Moscow, Russia

***Phycobilisomes in phenomena of short-term light adaptations.***

**12:30- 13:00 (30 min) Lecture 12**

*Diana Kirilovsky*, iBiTec-S, Gif sur Yvette, France

***The orange carotenoid protein and photoprotection: in vitro reconstitution of the photoprotective mechanism.***

**13:00-14:30 Lunch**

**Chairpersons: Akiho Yokota (Japan); Nathan Nelson (Israel)**

**14:30-15:05 (35 min) Plenary Lecture 14**

*R. Khatypov, A. Khmel'nitsky, A. Khrustin, V. Shuvalov*, Institute for Basic Biological Problems, RAS, Moscow, Russia

***Primary charge separation within P870\* in WT and mutants of heterodimers of P in femtosecond time domain.***

**15:05-15:40 (35 min) Plenary Lecture 15**

*Miwa Sugiura*, Ehime University, Ehime, Japan

***Comparison of *Thermosynechococcus elongates* PS II composed of different D1.***

**15:40-16:10 (30 min) Lecture 13**

*Andrey B. Rubin*, Faculty of Biology, Moscow State University, Moscow, Russia

***Chlorophyll fluorescence and problems of ecological monitoring.***

**16:10-16:40 (30 min) Lecture 14**

*Frank Müh*, Institut für Theoretische Physik, Johannes Kepler Universität Linz, Linz, Austria

***Towards a structure-based understanding of excitation energy transfer in light-harvesting complexes.***

**16:40-17:00 (20 min) Coffee break**

**Chairpersons: Barry Bruce (USA); Imre Vass (Hungary);**

**17:00-17:30 (30 min) Lecture 15**

*Jorg Pieper*, University of Tartu, Tartu, Estonia

***Protein and hydration water dynamics in photosynthetic pigment-protein complexes.***

**17-30-18:00 (30 min) Lecture 16**

Gyozo Garab, Biological Research Center, HAS, Inst. Plant Physiology, Szeged, Hungary  
*Fast, reversible membrane-reorganizations in cyanobacterial and algal cells and in isolated plant thylakoid membranes.*

**18-00-18:30 (30 min) Lecture 17**

Ismayil Zulfugarov, Busan National University, Busan, Korea; Institute of Botany, ANAS, Baku, Azerbaijan  
*Superoxide production in the absence of energy-dependent quenching of chlorophyll fluorescence: The origin and the consequences.*

**Chairpersons:** Tatsuya Tomo (Japan); Anja Krieger-Liszkay (France); Ernest-Walter Knapp (Germany); Marc Brecht (Germany); Anjana Jajoo (India)

**18:30-19:30 (60 min) Poster viewing/discussion: Sections 7-13**

**19:00- Dinner**

**27 July (4th day) (Lectures, Special Events and Tours)**

**Chairpersons:** Kimiyuki Satoh (Japan); Jian-Ren Shen (Japan)

**8:30- 9:05 (35 min) Plenary Lecture 16**

Bill Rutherford, iBiTec-S, Gif sur Yvette, France  
*Photosystem II: an evolutionary view.*

**9:05-9:40 (35 min) Plenary Lecture 17**

Eva-Mari Aro, University of Turku, Finland  
*Alternative electron transfer routes in thylakoid membranes of chloroplasts and cyanobacteria.*

**9:40-10:15 (35 min) Plenary Lecture 18**

Robert Blankenship, Washington University, Washington, USA  
*Evolution of photosynthesis.*

**10:15 -10:35 (20 min) Coffee break**

**Chairpersons:** Jim Barber (UK); Kimiyuki Satoh (Japan); Suleyman Allakhverdiev (Russia)

**10:35-11:10 (35 min) Plenary Lecture 19**

Per E.M. Siegbahn, University of Stockholm, Stockholm, Sweden  
*Mechanism and structure for water oxidation based on computations.*

**11:10-11:40 (30 min) Lecture 18**

Fabrice Rappaport, Institut de Biologie Physico-Chimique, CNRS, France  
*Reinvestigating the role of short-circuits or alternative electron pathways: examples from the cytochrome *b<sub>6</sub>f* complex and the plastid terminal oxidase.*

**11:40-12:10 (30 min) Lecture 19**

Tatsuya Tomo, Tokyo University of Sciences, Tokyo, Japan  
*Current topics of chlorophyll-d dominated cyanobacterial photosystems.*

**12:10-12:40 (30 min) Lecture 20**

*Franz-Josef Schmitt*, Technical University, Berlin, Germany

***Excitation energy transfer processes in coupled phycobiliprotein complexes of *A. marina* and semiconductor nanocrystals forming hybrid structures.***

**12:40-13:10 (30 min) Lecture 21**

*Min Chen*, University of Sydney, Sydney, Australia

***Expanding the photosynthetic spectrum using red-shifted chlorophylls.***

**13:10-15:00 Lunch**

**Chairpersons: Holger Dau (Germany); Per Siegbahn (Sweden)**

**15:00-15:30 (30 min) Lecture 22**

*Julian Eaton-Rye*, University of Otago, Dunedin, New Zealand

***Photosystem II lipoprotein in cyanobacteria.***

**15:30- 16:00 (30 min) Lecture 23**

*Kentaro Ifuku*, Graduate School of Biostudies, Kyoto University, Kyoto, Japan

***Functional diversifications of photosystem II extrinsic subunits in higher plants.***

**16:00-16:30 (30 min) Lecture 24**

*Marc Nowaczyk*, Ruhr-University Bochum, Bochum, Germany

***The role of a novel dimeric photosystem II-Psb27 complex in PSII repair.***

**17:00**

**Special Events**

**1) Young Talents (3 awards/prizes)**

**2) Best posters (3 awards/prizes)**

**3) To take photos, all together**

**FREE TIME**

**28 July (5th day)**

**Chairpersons: Miyao Mitsue (Japan); Andrey Rubin (Russia)**

**8:30- 9:05 (35 min) Plenary Lecture 20**

*Akiho Yokota*, Nara Inst. Sci. Technol. (NAIST), Japan

***RuBisCO and Its Challenges.***

**9:05- 9:40 (35 min) Plenary Lecture 21**

*Ichiro Terashima*, Department of Biological Sciences, The University of Tokyo, Tokyo, Japan

***Chloroplast CO<sub>2</sub> concentration and Rubisco kinetic parameters in the elevated CO<sub>2</sub> world.***

**9:40-10:15 (35 min) Plenary Lecture 22**

*Govindjee*, University of Illinois, Illinois, USA

***Photosystem II: Unique role of bicarbonate.***

**10:15-10:45 (30 min) Lecture 25**

Vyacheslav V. Klimov, Institute of Basic Biological Problems, Russia

***Bicarbonate requirement for the water-oxidizing complex of photosystem II.***

**10:45-11:00 (15 min) Coffee break**

**Chairpersons: Arvi Freiberg (Estonia); Mahir Mamedov (Russia)**

**11:00- 11:30 (30 min) Lecture 26**

Vidadi M. Yusibov, Fraunhofer USA Center for Molecular Biotechnology, Delawer, USA

***Future of plant biotechnology: Industrial and health applications.***

**11:30-12:00 (30 min) Lecture 27**

Anjana Jajoo, Ahilya University, Indore, India

***Low pH causes structural re-organizations in thylakoid membranes of higher plants.***

**12:00-14:00 Lunch**

**Chairpersons: Vladimir Shuvalov (Russia); Bob Blankenship (USA)**

**14:00-14:30 (30 min) Lecture 28**

Seiji Akimoto, Molecular Photoscience Research Center, Kobe University, Kobe, Japan

***Adaptation of light-harvesting systems, probe by time-resolved fluorescence spectroscopy.***

**14-30-15:00 (30 min) Lecture 29**

Heiko Lokstein, University of Potsdam, Postdam, Germany

***Non-linear laser spectroscopy of pigment-pigment interactions in light-harvesting complexes.***

**15:00-15:30 (30 min) Lecture 30**

Hazem Kalaji, Warsaw University of Life Science, Warsaw, Poland

***Exploring the structure and function of photosynthetic apparatus by the use of simultaneous measurements of prompt and delayed fluorescence and modulated light reflection at 820 nm.***

**15:30-15:45 (15 min) Coffee break**

**Chairpersons: Vyacheslav Klimov (Russia); Govindjee (USA)**

**15:45-16:15 (30 min) Lecture 31**

Victor Solovyov, Department of Computer Science, Royal Holloway, London, UK

***Plant genomes bioinformatics and new sequencing technologies.***

**16:15-16:45 (30 min) Lecture 32**

Ilham A. Shahmuradov, Institute of Botany, Azerbaijan National Academy of Sciences, Baku, Azerbaijan

***Bioinformatics approach in studies of plant gene transcription and mRNA polyadenylation.***

**16:45-17:15 (30 min) Lecture 33**

Tarlan H. Mamedov, Fraunhofer USA Center for Molecular Biotechnology, Delawer, USA;

Institute of Botany, Azerbaijan National Academy of Sciences, Baku, Azerbaijan

***Target modification in plants by co-expressing with modifying enzymes.***

**19:00- Banquet**

**29 July (6th day)**

**Chairpersons: John Golbeck (USA); Tatsuya Tomo (Japan); Gyoza Garab (Hungary)**

**8:30- 9:05 (35 min) Plenary Lecture 23**

*Barry D. Bruce*, Sustainable Energy and Education Research Center (SEERC), University of Tennessee, Tennessee, USA

***Strategies for integration of photosynthetic complexes into photovoltaic devices***

**9:05-9:35 (30 min) Lecture 34**

*Olaf Kruse*, Bielefeld University, Center for Biotechnology, Germany

***Molecular aspects of light to biomass conversion.***

**9:35-10:05 (30 min) Lecture 35**

*Anatoliy Tsygankov*, Institute of Basic Biological Problems, RAS, Pushchino, Russia

***Purple bacteria as hydrogen producers.***

**10:05-10:35 (30 min) Lecture 36**

*Harvey J.M. Hou*, University of Massachusetts, Dartmouth, USA

***Mimicking PS II using Mn-oxo complex/tungsten oxide catalytic material.***

**10:35-10:50 (15 min) Coffee break**

**Chairpersons: Olaf Kruse (Germany); Yashar Feyzиеv (Azerbaijan)**

**10:50- 11:20 (30 min) Lecture 37**

*Joanna Grzyb*, Institute of Physics, PAS, Warsaw, Poland

***De novo designed proteins - modules for photosynthetic systems.***

**11:20-11:50 (30 min) Lecture 38**

*Khurram Saleem Joya*, Department of Chemistry, Leiden University, Leiden, The Netherlands

***A new class of highly efficient and easy accessible single site molecular water splitting catalysts.***

**12:00-13:30 Lunch**

**14:00 Closing ceremony**

Jalal Aliyev (Azerbaijan), Jim Barber (UK), Eva-Mari Aro (Finland), Bill Rutherford (France),  
Bob Blankenship (USA)

**30 July (7th day) Departure**

# **POSTER PROGRAMME**

MONDAY  
July 25, 2011

18:30-19:30 (60 min) Poster viewing/discussion: Sections 1-6

**Chairpersons:**

**Athina Zouni (Germany); Julian Eaton-Rye (New Zealand); Esa Tyystjarvi (Finland);  
Diana Kirilovsky (France)**

**PS 1. Agnieszka Hałas, Pierre Sebban, Krzysztof Matlak, Józef Korecki, Květoslava Burda  
Diamagnetic state of non-heme iron in bacterial reaction centers treated with  $\text{Cu}^{2+}$**

**PS 2. Andrey G. Yakovlev, Ludmila G. Vasiliyeva, Anatoliy Ya. Shkuropatov, Vladimir A. Shuvalov  
Coherent effects at charge separation in mutant *Rba. sphaeroides* reaction centers with  
altered P/P<sup>+</sup> midpoint potential**

**PS 3. Carina Glöckner, Matthias Broser, Azat Gabdulkhakov, Albert Guskov, Jan Kern, Frank  
Müh, Wolfram Saenger, Athina Zouni  
Characterization of the binding of the herbicide terbutryn to photosystem II on a structural basis**

**PS 4. Denis V. Yanykin, Andrei A. Khorobrykh, Sergey A. Khorobrykh, Vyacheslav V. Klimov  
Photoconsumption of oxygen on the donor side of PSII after manganese removal from the  
water-oxidizing complex**

**PS 5. Julia Hellmich, Jan Kern, Azat Gabdulkhakov, Matthias Broser, Albert Guskov, Wolfram  
Saenger, Athina Zouni  
Focus on lipids: comparative study of the lipid content of photosystem II in the 2.9 Å and 1.9  
Å resolution crystal structures**

**PS 6. Keisuke Saito, Hiroshi Ishikita  
Cationic state distributions over chlorophyll pairs in photosystem I and II**

**PS 7. Leyla Abasova, Rakefet Schwarz, Imre Vass  
The role of the PsbU subunit in the light sensitivity of PSII in the cyanobacterium  
*Synechococcus* 7942**

**PS 8. Lyudmila Vasilieva, Tatyana Fufina, Ravil Khatypov, Vladimir Shuvalov  
Properties of *Rhodobacter sphaeroides* mutant reaction centers with amino acid  
substitutions near bacteriochlorophylls**

**PS 9. Maria M. Leonova, Ludmila G. Vasiliyeva, Ravil A. Khatypov, Anton Yu. Khmelnskiy,  
Anton M. Khristin, Vladimir A. Shuvalov  
Electron transfer in *Rhodobacter sphaeroides* mutant reaction centers in the absence of the  
monomer bacteriochlorophyll molecule B<sub>A</sub>**

**PS 10. Mercedes Roncel, Fernando Guerrero, Diana Kirilovsky, José M Ortega  
Re-evaluation of the role of the photosynthetic cytochrome  $c_{550}$**

**PS 11. Petko Chernev, Ivelina Zaharieva, Holger Dau, Michael Haumann  
Carboxylate shift of bicarbonate at the Q<sub>A</sub>-Fe-Q<sub>B</sub> site in photosystem II: X-ray spectroscopy  
and DFT**

PS 12. Natallia L. Pshybytko, Liudmila F. Kabashnikova, Kazimierz Strzalka  
**Electron flows in chloroplasts under heat stress. Role of ferredoxin redox state**

PS 13. Tatsuya Tomo, Akari Makita, Naoki Ito, Ryo Nagao, Hideyuki Adachi, Hisataka Ohta, Jian-Ren Shen, Hiroyuki Mino  
**Topological analysis of PsbQ' subunit in *Cyanidium caldarium* PS II by ESR and crosslinking analysis**

PS 14. Tohru Tsuchiya, Tadashi Mizoguchi, Seiji Akimoto, Hayato Kindo, Tatsuya Tomo, Hitoshi Tamiaki, Mamoru Mimuro  
**Spectroscopic properties of photosystems isolated from the transformant of *Acaryochloris marina* that accumulates a novel chlorophyll species**

PS 15. Vadim Zagidullin, Gernot Renger, Heiko Lockstein, Vladimir Paschenko  
**Interaction between semiconductor quantum dots and reaction centers of *Rb. sphaeroides* in liposomes**

PS 16. Pavel Krasilnikov, Peter Knox, Nuraniya Seifullina, Nadezda Grishanova, Vladimir Paschenko  
**Influence of solvates on the redox potential of cofactors in photosynthetic RCs**

PS 17. Yuri Stolovitsky  
**View development of the pheophytin role in photosynthesis: the suggestive oxidized pheophytin participation in water oxidation**

PS 18. Aleksandra Orzechowska, Joanna Fiedor, Marzena Lipińska, Martin Trtílek, Leszek Fiedor, Kazimierz Strzalka, Květoslava Burda  
**Origin of the thermoluminescence signal observed in reaction centers from *Rhodobacter sphaeroides***

PS 19. Eldar A. Kasumov, Ruslan E. Kasumov, Irina V. Kasumova  
**The role of the cyclic shrinkage-swelling in electron transfer and phosphorylation**

PS 20. Maria M. Mubarakshina, Anja Krieger-Liszkay, Marina A. Kozuleva, Ilya A. Naydov, Boris N. Ivanov  
**The production of reactive oxygen species by photosynthetic electron flow and the role of aquaporins in H<sub>2</sub>O<sub>2</sub> and CO<sub>2</sub> diffusion through the chloroplast envelope membrane**

PS 21. Mehmet Sayim Karacan, Alexandr Shitov, Elena V. Kupriyanova, Sergey Zharmukhamedov, Nurcan Karacan, Serhat Mamaş, Neslihan Özbek, Ummuhan Özmen, Ayla Balaban, Vyacheslav V. Klimov, Dmitry A. Los, Suleyman I. Allakhverdiev  
**Inhibition of photosystem II carbonic anhydrase activity by some sulphonamides and their metal complexes**

PS 22. Mehmet Sayim Karacan, Nurcan Karacan, Çiğdem Yakan, Sergey K. Zharmukhamedov, Alexandr Shitov, Mehmet Yakan, Vyacheslav V. Klimov, Suleyman I. Allakhverdiev  
**Quantitative structure-activity relationship analysis of perfluoroisopropyl-dinitrobenzene derivatives known as photosystem II electron transfer inhibitors**

PS 23. Alexandr Shitov, Sergey Zharmukhamedov, Tatiana Shutova, Suleyman Allakhverdiev, Goran Samuelsson, Viacheslav Klimov  
**A carbonic anhydrase inhibitor induces bicarbonate-reversible suppression of electron transfer in pea photosystem 2 membrane fragments**



- PS 24.** André Klauss, Thomas Sikora, Björn Süss, Michael Haumann, Holger Dau  
**Time-resolved detection of sub-microsecond volume changes of photosystem II (PSII) in its different S-states by laser-induced optoacoustic spectroscopy (LIOAS)**
- PS 25.** Leonid Rapatskiy, Nicholas Cox, William Ames, Anton Savitsky, Julia Sander, Marc Nowaczyk, Matthias Rögner, Alain Boussac, Frank Neese, Johannes Messinger, Wolfgang Lubitz  
**Detection of water binding to photosystem II, a multifrequency  $^1\text{H}/^2\text{H}/^{15}\text{N}/^{17}\text{O}$ -ENDOR study; an experimental determination of the protonation state of the  $\text{S}_2$  state**
- PS 26.** Masami Kusunoki  
**The super-reduced  $\text{S}_{-1}$ -state in isomeric equilibrium of oxygen-evolving photosystem II as disclosed from 1.9 Å resolution XRD data**
- PS 27.** Nadezhda I. Shutilova  
**On the principles of organization of the water-oxidation center in the structure of the oxygen-evolving chloroplast complex**
- PS 28.** Yashar Feyziyev, Gábor Bernát, Zsuzsanna Deák, Stenbjörn Styring  
**Electron transfer from Cyt  $b_{559}$  and tyrosineD to the  $\text{S}_2$  and  $\text{S}_3$  states of the water oxidizing complex of photosystem II at cryogenic temperatures**
- PS 29.** E.G. Maksimov, V.Z. Paschenko, G. Renger, A.B. Rubin  
**Temperature dependent properties of allophycocyanin fluorescence**
- PS 30.** Go Tei, Masatoshi Nakatani, Hajime Ishihara  
**The relation between the efficiency of excitation energy transfer and ring size of ring-shaped light harvesting complex**
- PS 31.** Ilya Stepanenko, Viktor Kompanetz, Zoya Makhneva, Sergey Chekalin, Andrei Moskalenko, Andrei Razjivin  
**The nature of broad band in the two-photon excitation spectra of light-harvesting complexes from purple bacteria**
- PS 32.** J. Pieper, M. Rätser, I. Trostmann, F.-J. Schmitt, C. Theiss, H. Paulsen, H.J. Eichler, A. Freiberg, G. Renger  
**Exitonic energy level structure and pigment-protein interactions in the recombinant water-soluble chlorophyll protein**
- PS 33.** Mai Watanabe, Rei Narikawa, Masahiko Ikeuchi  
**Photosystem I specific phycobilisome in *Anabaena* sp. PCC 7120**
- PS 34.** Mohammad A.A. Al-Najjar, Dirk De Beer, Michael Kühl, Lubos Polerecky  
**Light utilization efficiency in photosynthetic microbial mats**
- PS 35.** Andrey Yakovlev, Vladimir Novoderezhkin, Alexandra Taisova, Anastasiya Zobova, Zoya Fetisova  
**Experimental proof of optimality of interfacing of B740 BChl *c*, B798 BChl *a* AND B808 BChl *a* subantennae in superantenna of the green photosynthetic bacterium *Chloroflexus aurantiacus***
- PS 36.** Hasan G. Babayev, Ulduza A. Mehvaliyeva, Minakhanim N. Aliyeva, Novruz M. Guliyev  
**Comparative investigation of dynamics of changes in  $\text{H}^+$ - Pumps in roots and  $\text{CO}_2$  metabolism enzyme activities in leaves of different wheat genotypes under high salt concentrations**

PS 37. Nataliya Pronina, Elena Kupriyanova, Suleyman Allakhverdiev  
**Functional role of carbonic anhydrase Cah3 associated with thylakoid membranes in the chloroplast and pyrenoid of *Chlamydomonas reinhardtii***

PS 38. Novruz Guliyev, Shahniyar Bayramov, Hasan Babayev, Minakhany Aliyeva  
**The role of light intensity, temperature and drought in the regulation of activities of malate dehydrogenases in wheat leaves**

PS 39. Olga Kershanskaya, Asiya Nurmagambetova, Liliya Skvortsova, Darya Nelidova, Larissa Rovenskaya  
**Photosynthesis improvement for sustainability in wheat through C<sub>3</sub> to C<sub>4</sub> engineering strategy**

PS 40. Emine Dinc, Szilvia Z. Tóth, Gert Schansker, László Kovács, Győző Garab, Sándor Bottka  
**Application of synthetic antisense oligodeoxy-nucleotides in higher plants**

PS 41. Loredana Peca, Ciprian Chis, Adriana Bica, Bogdan Drugă, Mihai Mituleţu, Victor Bercea, Ana Nicoară, Dorina Moldovan, Oana Sicora, Nicolae Dragoş, Cosmin Ionel Sicora  
**Multiple genes encoding D1 protein and their differential expression in *Anabaena variabilis* ATCC 29413 under microaerobic conditions**

**THURSDAY**  
**July 26, 2011**

**18:30-19:30 (60 min) Poster viewing/discussion: Sections 7-13**

**Chairpersons: Tatsuya Tomo (Japan); Anja Krieger-Liszkay (France); Ernest-Walter Knapp (Germany); Marc Brecht (Germany); Anjana Jajoo (India)**

PS 42. Rana Safarova, Oh Min-Hyuk, Ismayil S. Zulfugarov, Soyeon Park, Nam-Chon Paek, Choon-Hwan Lee  
**Characterization and fine mapping of an Arabidopsis stay-green mutant, *ORE10***

PS 43. Łucja Rudowska, Katarzyna Gieczewska, Radosław Mazur, Maciej Garstka, Agnieszka Mostowska  
**Chloroplast biogenesis – correlation between structure and function**

PS 44. Ziya K. Abilov, Natiga A. Nabiyeva, Leyla S. Veliyeva, Gulshan K. Ragimova, Ramiz Z. Shammedov  
**Interrelation of forming the pigment apparatus of chloroplasts and adaptation of plants under extreme influences**

PS 45. Abdumanon Abdullayev, Abdullojon Ergashev, Khurshed Karimov and Bachshulo Jumaev  
**Influence of extreme climatic factors on the rate of photosynthesis and carbon metabolism in wheat**

PS 46. Abdus Subhan Mollick and Hideo Yamasaki  
**Characterization of the tropical ornamental tree *Codiaeum variegatum* cultivars by chlorophyll fluorescence imaging**

- PS 47. Alexander G. Ivanov, Prafullachandra V. Sane, Ilian Simidjiev, You-Il Park, Norman P.A. Huner, Gunnar Öquist  
**Differential alteration in photosynthetic electron flux in a  $\Delta petE$  mutant of *Synechococcus* sp. PCC 7942 exposed to iron stress**
- PS 48. Altanzaya Tovuu, Ismayil S. Zulfugarov, Byoung-Yong Moon, Choon-Hwan Lee  
**Omega-3 fatty acid desaturase mutant of rice (*Oryza sativa* L.) has defect for maintaining normal thylakoid membrane fluidity**
- PS 49. Krishna Nath, Roshan Sharma Poudyal, Ismayil S. Zulfugarov, Altanzaya Tovuu, Joon-Seob Eom, Young-Saeng Kim, Ho-Sung Yoon, Gynheung An, Jong-Seong Jeon, Choon-Hwan Lee  
**Impairment of photosystem II repair and accumulation of reactive oxygen species in STN8 kinase knock-out rice mutants**
- PS 50. Deepak Kumar Yadav and Pavel Pospíšil  
**Hydroxyl radical production in photosystem II under heat stress: electron paramagnetic resonance spin-trapping study**
- PS 51. Zarifa Suleymanova, Durna Aliyeva, Ulkar Ibrahimova, Alamdar Mammadov  
**The influence of salt stress on some physiological parameters and peroxidase isoenzymes in two wheat (*Triticum aestivum* L.) cultivars**
- PS 52. Elimkhan Jafarov, Jamala Orujova, Aysel Jafarli  
**Influence of ionized radiation to plant photosynthesis, cultivated under the radiation conditions**
- PS 53. Galina Nazarova, Anatoly Kosobrukhov, Anatoly Ivanov, Vladimir Kreslavski, Valery Lyubimov, Karl Biel, Irina Fomina  
**Pigment composition and the photosynthesis in cyanobacteria lacking antioxidant genes**
- PS 54. Hiroko Tahara, Toshihiro Yoshihara, Kouji Matsumoto, Junji Uchiyama, Hisataka Ohta  
**Putative ABC transporter permease protein Slr1045 of cyanobacterium *Synechocystis* sp. PCC6803 involved in acid stress resistance**
- PS 55. Hiroshi Katoh  
**Study of desiccation induced genes from the nitrogen-fixing terrestrial cyanobacterium *Anabanea (Nostoc)* sp. PCC7120**
- PS 56. Sadaqat Asadova, Ibrahim Azizov, Mahira Mamedova, Tofiq Garagezov  
**Formation peculiarities of photosynthetic apparatus of embryogenic structures and intact plants affected by sudden and gradual stressor attack**
- PS 57. Irada M. Huseynova  
**Photosynthetic characteristics and enzymatic antioxidant capacity of leaves from wheat cultivars exposed to drought**
- PS 58. Irina Fomina, Vladimir Kreslavski, Anatoly Ivanov, Galina Nazarova, Anatoly Kosobrukhov, Karl Biel, Stephen Herbert  
**Photoinhibition and recovery of photosynthetic activity in *Synechocystis* sp. PCC 6803: the role of catalase-peroxidase**
- PS 59. Jeyhuna Jafarova and Rena Ganiyeva  
**Possible function of ascorbate in protection of chloroplasts against photooxidative stress**

PS 60. Junji Uchiyama, Ryosuke Asakura, Mayuko Kimura, Atsushi Moriyama, Hiroko Tahara, Yuta Kobayashi, Yuko Kubo, Toshihiro Yoshihara, Hisataka Ohta  
**The Sph two component signal transduction pathway of *Synechocystis* sp. PCC 6803 regulates transcription of the gene specifying acid stress-inducible protein Slr0967 and Slr0939**

PS 61. S.S. Baroniya, S. Kataria, G.P. Pandey, K.N. Guruprasad  
**Influence of exclusion on photosynthesis and yield in two *Glycine max* L. varieties**

PS 62. Konul H. Bayramova, Elmira H. Maharramova, Irada M. Huseynova  
**The study of antocianine, photosynthetic pigments and activities of antioxidant enzymes in *Argusia sibirica* (L.) Dandy at different levels of background radiation**

PS 63. Lisa Olshansky, Paul M. Berube, Charles F. Yocum, Sallie W. Chisholm, Daniel G. Nocera  
**Manganese limitation in low-light adapted *Prochlorococcus***

PS 64. Marek Zivcak, Marian Brestic, Katarina Olsovska, Pavol Hauptvogel  
**Identification of susceptibility of photosynthetic apparatus to high temperature in wheat genotypes using chlorophyll fluorescence analyses**

PS 65. Nargiz Sultanova and Irada Huseynova  
**Some photosynthesis parameters and antioxidant defense systems of nanovirus infected faba bean leaves**

PS 66. Radosław Mazur, Łucja Rudowska, Izabela Rumak, Agnieszka Mostowska, Maciej Garstka  
**The different effect of dark chilling on LHCII phosphorylation level in pea and bean plants and its impact on chloroplast structure**

PS 67. Saftar Y. Suleymanov  
**Changes in the activity of antioxidant enzymes and functional state of PS II in maize (*Zea mays* L.) exposed to radium (226Ra)**

PS 68. Satoshi Tanaka, Hitoshi Miyasaka, Yuzo Shioi, Yoshimi Suzuki, Masahiro Tamoi, Toru Takeda, Shigeru Shigeoka, Kazumasa Hirata  
**Comparative studies on three *Chlamydomonas* strains which show distinctive oxidative stress tolerance**

PS 69. Sonal Mathur and Anjana Jajoo  
**Alterations in PSII heterogeneity in response to high temperature stress**

PS 70. Alexander G. Ivanov, Suleyman I. Allakhverdiev, Norio Murata, Norman P.A. Huner  
**Differential effects of decreased fatty acid unsaturation of phosphatidylglycerol in thylakoid membranes on PSII and PSI photochemistry under photoinhibitory conditions in tobacco plants**

PS 71. Ulkar Ibrahimova  
**Nitrogen, potassium and sodium content in wheat cultivars under salinity**

PS 72. Vasilij Goltsev, Ivelina Zaharieva, Petko Chernev, Margarita Kouzmanova, Ivan Yordanov, Vasilena Krasteva, Vladimir Alexandrov, Reto J. Strasser  
**Drought-induced modifications of the photosynthetic electron transport in intact leaves: OJIP transients as a tool for rapid non-invasive estimation of water content**

PS 73. Václav Karlický, Ondřej Strouhal, Petr Ilík, Michal Štroch, Irena Kurasová, Vladimír Špunda  
**The acclimation of the photosynthetic apparatus to different intensity of PAR**

- PS 74. Ivelina Zaharieva, Petko Chernev, Anna Fischer, Holger Dau  
**A novel electrodeposited Mn film mimicking the Mn cluster in photosystem II as an efficient catalyst for water oxidation**
- PS 75. Khorcheska A. Batyrova, Anatoly A. Tsygankov, Sergey N. Kosourov  
**Sustained hydrogen photoproduction by phosphorous-deprived *Chlamydomonas reinhardtii***
- PS 76. Zinaida Eltsova and Anatoliy Tsygankov  
**Purple bacteria mutants with low pigment content: do they have higher potential as hydrogen producers?**
- PS 77. Hiroshi Katoh, Yuji Yamaguchi, Hiroyuki Takenaka  
**Study of effective utilization of the N<sub>2</sub>-fixing terrestrial cyanobacterium *Nostoc commune***
- PS 78. Marian Brestic, Marek Zivcak, Andrea Valigurova, Pavol Hauptvogel  
**Comparative study of leaf photosynthetic performance and temperature response in *Triticeae*: modern wheat variety vs. landrace and wild relative**
- PS 79. Olga Avercheva, Elizaveta Bassarskaya, Vasiliy Ptushenko, Svetlana Smolyanina, Yulij Berkovich, Alexei Erokhin, Tatiana Zhigalova  
**Narrow-band red-blue light as a modulating factor for photosynthetic and growth processes**
- PS 80. Samira M. Rustamova, Masma Y. Nasrullayeva, Irada M. Huseynova  
**Changes in activity of some antioxidant enzymes in barley (*Hordeum vulgare* L.) cultivars in response to drought**
- PS 81. Rika Heshiki and Hideo Yamasaki  
**Application of *Ficus microcarpa* cv. golden leaves to photosynthetic education**
- PS 82. Vagif Amikishiyev, Adil Aliyev, Turgut Mehdiyev, Garib N. Murshudov  
**A search for a fragment space: organisation and use of prior structural knowledge**
- PS 83. Victor Solovyev, Igor Seledtsov, Denis Vorobyev, Petr Kosarev  
**Computational tools for identification of disease specific genes and infections diagnostics using next generation sequencing data**
- PS 84. Javanshir Talai  
**Morphophysiological traits of newly developed high productive wheat varieties**
- PS 85. Tofiq Allahverdiyev, Atif Zamanov, Javanshir Talai  
**Effect of soil water deficit on gas exchange parameters, relative water content and assimilating surface area of leaves from bread wheat genotypes**
- PS 86. Rovshan Khalilov, Aygun Nasibova  
**The role of photosynthesis processes in the synthesis of plant-based magnetic nanoparticles**